WHAT IS CLAIMED IS:

1. A cyclone filter for separating particles from a fluid, comprising:

a cylindrical chamber having an inlet for receiving the fluid with the particles;

a ring having a plurality of grooves,

the ring being concentric to the cylindrical chamber,

the ring having an outer diameter on a first end that is smaller than a diameter of the cylindrical chamber, thus defining a distribution channel;

an intermediate tube adapted to receive fluid from the grooves;

a collection chamber having an upper cylindrical portion connected to a substantially frustoconical portion, the collection chamber having a solids outlet located on a lower end of the frustoconical portion, an upper end of the upper cylindrical portion being connected to the intermediate tube; and

a vortex finder tube being concentric with the intermediate tube thus defining a down-flow annulus on one end and having a fluid outlet on the other end extending upwardly out of the cylindrical chamber.

2. The cyclone filter of claim 1 in which the grooves in the ring are spiral.

3. The cyclone filter of claim 1 in which an outer diameter on a second end of the ring is substantially equal to the diameter of the cylindrical chamber.

4. The cyclone filter of claim 1 in which the ring has a depth substantially equal to a depth of the grooves therein.

5. The cyclone filter of claim 1 in which an outer diameter of the second end of the ring is substantially equal to a diameter of the intermediate tube.

6. The cyclone filter of claim 1 further comprising:

a deflector located within the upper cylindrical portion of the collection chamber to reverse the fluid flow and to force the particles into the lower frustoconical portion of collection chamber.

7. The cyclone filter of claim 1 in which the inlet is radially disposed on the cylindrical chamber.

8. A method of separating particles from a fluid stream comprising:

passing the fluid with particles into an inlet of a cyclone filter;

passing the fluid with particles through a distribution channel formed between an outside radius of a ring and a larger radius of a cylindrical chamber;

passing the fluid with particles through a plurality of grooves in the ring;

spiraling the fluid with particles down a downflow annulus formed between a vortex finder tube and an intermediate tube;

providing a collection chamber having a cylindrical upper portion and a frustoconical lower portion;

removing the particles from the fluid by contacting the fluid with particles with a deflector located within the cylindrical upper portion of the collection chamber, the fluid reversing direction upon contact with the deflector;

collecting the particles in the lower cylindrical portion of the collection chamber; and

expelling the fluid through a fluid outlet at an upper end of the vortex finder tube.

9. The method of claim 8 further comprising:

removing the particles via an outlet located at a bottom end of the frustoconical lower portion of the collection chamber.

10. A cyclone filter for separating particles from a fluid comprising:

a cylindrical chamber having an inlet for receiving the fluid with the particles;

a ring having a plurality of grooves,

the ring being concentric to the cylindrical chamber,

the ring having an outer diameter on a first end that is smaller than a diameter of the cylindrical chamber, thus defining a distribution channel;

a collection chamber having an upper cylindrical portion connected to a lower substantially frustoconical portion, the collection chamber having a solids outlet located on a lower end and having an upper end adapted to receive fluid from one grooves; and

a tube being coaxial with the collection chamber, the tube having one end disposed inside the upper cylindrical portion of the collection chamber, the tube having another end extending upwardly out of the cylindrical chamber.

11. The cyclone filter of claim 10 in which the grooves in the ring spiral involutely.

12. The cyclone filter of claim 10 in which the ring has a depth substantially equal to a depth of the grooves therein.

13. The cyclone filter of claim 10 in which an inner diameter of the ring is substantially equal to a diameter an upper cylindrical end of the of the collection chamber.

14. The cyclone filter of claim 10 in which the inlet is radially disposed on the cylindrical chamber.

15. The cyclone filter of claim 10 in which the tube is a vortex finder tube.

16. The cyclone filter of claim 10 in which the grooves in the ring spiral involutely.

17. A method of separating particles from a fluid stream comprising:

passing the fluid with particles into an inlet of a cyclone filter;

passing the fluid with particles through a distribution channel formed between an outside radius of a ring and a larger radius of a cylindrical chamber;

passing the fluid with particles through a plurality of grooves in the ring;

spiraling the fluid with particles down a downflow annulus formed between a skirt and an upper cylindrical end of a collection chamber;

spiraling the fluid with particles through the downflow annulus into a lower frustoconical end of a collection chamber;

removing the particles from the fluid by reversing the direction of the fluid via a low pressure of a vortex;

collecting the particles in the lower cylindrical portion of the collection chamber; and

expelling the fluid through a fluid outlet at an upper end of the skirt.

18. A cyclone filter for separating particles from a fluid comprising:

a cylindrical chamber having an inlet for receiving the fluid with the particles;

a ring having a plurality of grooves,

the ring being concentric to the cylindrical chamber;

a collection chamber having an upper cylindrical portion connected to a lower substantially frustoconical portion, the collection chamber having a solids outlet located on a lower end and having an upper end adapted to receive fluid from the grooves, the ring having an outer diameter that is smaller

than a diameter of the upper cylindrical portion of collection chamber, thus defining a distribution channel; and

a skirt being coaxial with the collection chamber, the skirt having one end disposed inside the upper cylindrical portion of the collection chamber, the tube having another end extending upwardly out of the upper cylindrical portion of the collection chamber.

19. The cyclone filter of claim 18 in which the grooves in the ring spiral involutely.

20. The cyclone filter of claim 18 in which an inner diameter of the ring is substantially equal to a diameter of the end of the skirt extending upwardly out of the upper cylindrical portion of the collection chamber.

21. The cyclone filter of claim 18 in which the inlet is radially disposed on the cylindrical chamber.

22. The cyclone filter of claim 18 in which the grooves in the ring spiral involutely.

23. A method of separating particles from a fluid stream comprising:

passing the fluid with particles into an inlet of a cyclone filter;

passing the fluid with particles through a distribution channel formed between an outside radius of a ring and a larger radius of an upper cylindrical portion of a collection chamber;

passing the fluid with particles through a plurality of grooves in the ring;

spiraling the fluid with particles down a downflow annulus formed between a skirt and an upper cylindrical end of a collection chamber;

spiraling the fluid with particles through the downflow annulus into a lower frustoconical end of a collection chamber;

removing the particles from the fluid by reversing the direction of the fluid via a negative pressure of a vortex;

collecting the particles in the lower cylindrical portion of the collection chamber; and

expelling the fluid through a fluid outlet at an upper end of the skirt.

24. A fluid mixer to saturate liquids with gases comprising:

a cylindrical donut housing having a fluid inlet;

a ring having a plurality of grooves,

the ring being concentric to the cylindrical donut housing,
the ring having an outer diameter on a first end that is smaller than a diameter of the cylindrical donut housing, thus defining a distribution channel;

a cylinder concentric with the ring and surrounded by the ring, the cylinder in fluid communication with the distribution channel via the grooves, the cylinder having a gas inlet to receive gas and a liquid outlet to discharge liquids;

a porous gas diffuser disposed within the cylinder, the diffuser having an impervious flat top and shaped as an inverted cone,
the diffuser connected to a gas inlet; and

a gas outlet for releasing excess gas.

25. The fluid mixer of claim 24 in which the grooves in the ring are spiral.

26. The fluid mixer of claim 24 in which the grooves in the ring are radial.

27. A method of mixing fluid to saturate liquids with gases comprising:

inserting fluid into a fluid mixer via a fluid inlet in a cylindrical donut housing;

flowing the fluid through a distribution channel in a ring having a plurality of grooves, the ring being concentric to the cylindrical donut housing, the ring having an outer diameter on a first end that is smaller than a diameter of the cylindrical donut housing thus defining the distribution channel;

forcing the fluid in a downwardly spiral a cylinder by passing the fluid through the plurality of grooves and into the cylinder concentric with the ring and surrounded by the ring, the cylinder in fluid communication with the distribution channel via the grooves;

inserting gas into the cylinder via a gas inlet, the gas passing through a porous gas diffuser disposed within the cylinder, the diffuser having an impervious flat top;

dissolving gas exiting the porous diffusion into pressurized circulating fluid, the fluid flowing in a generally downward spiral direction, the gas bubbling upward;

mixing the downward spiraling fluid with the upwardly bubbling gas in a mixing zone in the cylinder; and

removing a fluid saturated with gas at a fluid outlet located on a bottom surface of the cylinder.

28. The method of claim 27 further comprising providing the diffuser having an inverted cone shape.

29. A fluid mixer to saturate liquids with gases comprising:

an upper housing having a cylindrical donut with a fluid inlet, the upper housing having a gas separation chamber to separate excess gases from liquids for discharging gas through a gas outlet on the upper housing;

a ring having a plurality of grooves,

the ring being concentric to the cylindrical donut housing,

the ring having an outer diameter on a first end that is smaller than a diameter of the cylindrical donut housing, thus defining a distribution channel;

an orifice ring adapted to inject gas in liquid leaving the grooves; and

a cylinder concentric with the ring and surrounded by the ring, the cylinder in fluid communication with the distribution channel via the grooves, a saturated liquid outlet being located at a bottom of the cylinder.

30. The fluid mixer of claim 29 further comprising:

a gas inlet meter at the gas inlet for regulating the amount of gas supplied;

a gas outlet meter at the gas outlet for regulating the amount of saturated liquid exiting the cylinder.

31. The fluid mixer of claim 29 in which the grooves are radial.

32. A method of saturating fluids with gases comprising:

inserting fluid into a fluid mixer via a fluid inlet in an upper housing, the upper housing having a cylindrical donut with the fluid inlet;

flowing the fluid through a distribution channel in a ring having a plurality of grooves, the ring being concentric to the cylindrical donut housing, the

ring having an outer diameter on a first end that is smaller than a diameter of the cylindrical donut housing thus defining the distribution channel;

forcing the fluid in a downward in a cylinder by passing the fluid through the grooves and into the cylinder concentric with the ring and surrounded by the ring, the cylinder in fluid communication with the distribution channel via the grooves;

injecting gas to the fluid leaving the grooves with an orifice ring in fluid communication with a gas inlet;

separating excess gases from liquids in a gas separation chamber in the upper housing;

discharging excess gases through a gas outlet on the upper housing; and

removing saturated liquid from the cylinder via a saturated liquid outlet located at the bottom of the cylinder.

33. The method of claim 32 further comprising:

regulating the amount of gas entering gas inlet of the orifice plate; and

regulating the amount of gas exiting the gas outlet.

34. A fluid mixer to mix multiple fluids comprising:

an upper donut housing with a first fluid inlet, the upper housing;

a ring having a plurality of grooves,

the ring being concentric to the upper donut housing,

the ring having an outer diameter on a first end that is smaller than a diameter of the donut housing thus defining a distribution channel;

an orifice ring adapted to inject a second liquid into the first liquid leaving the grooves; and

a cylinder concentric with the ring and surrounded by the ring, the cylinder in fluid communication with the distribution channel via the grooves, a liquid outlet being located at a bottom of the cylinder.

35. The fluid mixer of claim 34 in which the grooves are radial.

36. The fluid mixer of claim 34 in which the orifice ring is a venturi-orifice ring.

37. A method of mixing fluids comprising:

inserting a first fluid into a fluid mixer via a first fluid inlet in an upper donut housing;

flowing the fluid through a distribution channel in a ring having a plurality of grooves, the ring being concentric to the upper donut housing, the ring having an outer diameter on a first end that is smaller than a diameter of the upper donut housing thus defining the distribution channel;

forcing the first fluid in a downwardly spiral in a cylinder by passing the fluid through the grooves and into the cylinder, the cylinder concentric with the ring and surrounded by the ring, the cylinder in fluid communication with the distribution channel via the grooves;

injecting a second fluid into the fluid leaving the grooves with an orifice ring in fluid communication with a second fluid inlet; and

removing the mixed fluid from the cylinder via a mixed fluid outlet located at the bottom of the cylinder.